Name:

at1121exam_practice: Radicals and Squares (v606)

Question 1

Simplify the radical expressions.

$\sqrt{45}$	$\sqrt{12}$	$\sqrt{28}$
$\sqrt{3 \cdot 3 \cdot 5}$	$\sqrt{2 \cdot 2 \cdot 3}$	$\sqrt{2 \cdot 2 \cdot 7}$
$3\sqrt{5}$	$2\sqrt{3}$	$2\sqrt{7}$

Question 2

Find all solutions to the equation below:

$$5(x+7)^2 + 6 \;=\; 86$$

First, subtract 6 from both sides.

$$5(x+7)^2 = 80$$

Then, divide both sides by 5.

$$(x+7)^2 = 16$$

Undo the squaring. Remember the plus-minus symbol.

$$x + 7 = \pm 4$$

Subtract 7 from both sides.

$$x = -7 \pm 4$$

So the two solutions are $x = -3$ and $x = -11$.

Question 3

By completing the square, find both solutions to the given equation. *You must show work for full credit!*

$$x^2 - 10x = 39$$

$$x^2 - 10x + 25 = 39 + 25$$
$$x^2 - 10x + 25 = 64$$
$$(x-5)^2 = 64$$
$$x - 5 = \pm 8$$
$$x = 5 \pm 8$$
$$x = 13 \quad \text{or} \quad x = -3$$

Question 4

A quadratic polynomial function is shown below in standard form.

$$y = 3x^2 - 24x + 41$$

Express the function in **vertex form** and identify the **location** of the vertex.

From the first two terms, factor out 3 .

$$y = 3(x^2 - 8x) + 41$$

We want a perfect square. Halve -8 and square the result to get 16 . Add and subtract that value inside the parentheses.

$$y = 3(x^2 - 8x + 16 - 16) + 41$$

Factor the perfect-square trinomial.

$$y = 3((x-4)^2 - 16) + 41$$

Distribute the 3.

$$y = 3(x-4)^2 - 48 + 41$$

Combine the constants to get **vertex form**:

$$y = 3(x-4)^2 - 7$$

The vertex is at point $(4, -7)$.